

**NO FURTHER ACCELERATED ACTION JUSTIFICATION FOR TRENCH T-7****PAC REFERENCE NUMBER: NE-111.4**

IHSS Reference Number: 111.4

Unit Name: Trenches T-7.

Approximate Location: N750,000; E2,087,500

Date(s) of Operation or Occurrence

The exact dates of operation are unknown, except for the period of July 29, 1954, through August 14, 1968.

Description of Operation or Occurrence

Trench T-7 is located approximately 1,400 feet east of the inner east guard gate and 290 feet south of the East Access Road. It is part of several trenches referred to as the East Trenches (T-3 through T-11; PACs NE-110 and 111.1 through 111.8) (DOE 1992). The trenches were used primarily for the disposal of sanitary wastewater treatment plant sludge. Flattened empty drums and asphalt planking from the Solar Evaporation Ponds, both of which may be potentially contaminated with uranium and plutonium, also may have been disposed in the trenches. In addition, it is believed that water and lathe coolant generated in Building 444 was disposed in one of the East Trenches. Waste disposal in the trenches occurred between July 29, 1954 and August 14, 1968; however, the exact dates of waste disposal are unknown. No documentation has been found that records the time frame during which any particular trench was receiving waste.

T-7 is approximately 115 feet long, 14 to 16 feet wide and 12 feet in depth (i.e., 10 feet of waste material plus 2 feet of soil cover). The volume of waste material in the trench is estimated to be 798 cubic yards.

Physical/Chemical Description of Constituents Released

Some uranium and plutonium contamination is present in the sludge disposed in the trenches. It is reported that the older sludge would have had primarily uranium contamination with newer sludge having an increasing amount of plutonium contamination. Total long-lived alpha activity present in the sludge was reported between a minimum of 382 pCi/g in August 1964 to a maximum of 3,591 pCi/g in June 1960. Uranium contamination may also be present in flattened drums that may have been disposed in any of trenches T-2 through T-11 following burning of the contaminated oils that had been held in the drum. The burning of the contaminated oils had been done in Oil Burn Pit No-2 (PAC 900-153) from March 1957 to mid-1965, and not in the trenches. These flattened drums, estimated at up to 300 in total number, could be present in any of Trenches T-3 through T-11.

On at least one occasion it is believed that 2,400 gallons of water and lathe coolant generated in Building 444 was also disposed in one of the East Trenches. This waste had an average activity of 150,000 dpm/l. It is believed that this is total alpha activity. The activity of this material was

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reported as  $1.35 \times 10^8$  dpm with approximately 1.3 kilograms (kg) of depleted uranium present in the waste. It is unknown whether or not this material was in drums.

#### Responses to Operation or Occurrence

Soil samples were collected from T-7 and the results reported in the Trenches and Mound Site Characterization Report, September 1996 (DOE 1996). The COCs identified included plutonium, americium, uranium, metals, and volatile organic compounds (VOCs).

#### Fate of Constituents Released to Environment

New soil action levels (ALs) for protection of a wildlife refuge worker have been proposed in a modification to RFCA Attachment 5 dated 11/12/02. The modification also includes an integrated risk-based approach (application of the Soil Risk Screen) for evaluating the need for, or extent of accelerated actions at PACs. Trench T-7 has been assessed to render a No Further Accelerated Action (NFAA) determination using the new ALs and the Soil Risk Screen.

### **APPLICATION OF THE SOIL RISK SCREEN**

#### **Screen 1 – Are Contaminant of Concern (COC) Concentrations Below Table 3 Wildlife Refuge Worker (WRW) Soil Action Levels?**

No. Three boreholes (11895, 12095, and 11995) were drilled into the trench, and six other boreholes were drilled surrounding the trench (Figure 1)<sup>1</sup>. None of the samples collected from the boreholes surrounding the trench contained COC concentrations that exceed the soil ALs. Only two samples from the three boreholes that penetrated the trench contain COCs that exceed background and the ALs. These are the 3-5 foot interval samples from boreholes 11895 and 12095 (Figure 1). They contain plutonium and americium at concentrations that exceed their respective (ALs). All of the plutonium data for the three boreholes that penetrated the trench are summarized below in Table 1.

**Table 1 Plutonium Concentrations  
in Trench T-7 Waste**

Borehole	Depth Interval (ft)	Plutonium Concentration (pCi/g)
11895	3-5	1486
11895	8-10	0.01875
11995	3-8	0.03826
11995	8-10	0.01997
12095	3-5	2450
12095	8-10	0.4501

#### **Screen 2 – Is there potential for subsurface soil to become surface soil?**

No. T-7 is not in an area prone to landslides as shown in the attached Figure 2.

<sup>1</sup> Data shown in Figure 1 are only analytes concentrations that exceed background (metals and radionuclides), or exceed detection limits (organic compounds).

**Screen 3 – Does subsurface soil radiological contamination exceed criteria in Section 5.3 and Attachment 14?**

No. ALF Section 5.3(C)(2) requires the removal of soil in the 3-6 foot depth interval that contains plutonium at concentrations that exceed 3 nCi/g with an areal extent of contamination that exceeds 80m<sup>2</sup>. As shown in Table 1, plutonium concentrations do not exceed 3 nCi/g in any of the Trench T-7 waste samples.

**Screen 4 – Is there an environmental pathway and sufficient quantity of COC that would cause exceedance of surface water standards (SWS)?**

No. Contaminant migration via erosion and groundwater are the two possible pathways whereby surface water could become contaminated by Trench T-7. However erosion is an insignificant pathway because Trench T-7 is in a flat-lying area not prone to erosion, and the waste material is two feet below ground surface per the Historical Release Report (DOE 1992). Runoff from the area flows into the South Interceptor Ditch, via the East Spray Field Interceptor Channel, and then into Pond C-2. Water from Pond C-2 is monitored prior to discharge.

With respect to the groundwater pathway, T-7 is located near a hydraulic divide where water may migrate to the north/northeast or to the south/southeast depending on groundwater levels. Most of time, the wells in the vicinity of Trench T-7 are dry. In 1992, there was sufficient groundwater in the area for sampling, and a sample was collected from nearby well 8391. The sample contains VOCs at concentrations greater than RFCA Tier II ALs, but the concentrations are below RFCA Tier I ALs (see Table 2).

**Table 2**  
**Groundwater Concentrations Exceeding Action Levels**

Well	Sample Number	Collection Date	Analyte	Results (mg/L)	Detection Limit (mg/L)	Tier II Action Level (mg/L)
8391	GW034781T	9/3/92	Carbon tetrachloride	0.009	0.0001	0.005
8391	GW034781T	9/3/92	Tetrachloroethene	0.32	0.00014	0.005
8391	GW034781T	9/3/92	Trichloroethene	0.022	0.00028	0.005

Source: DOE 1996.

When there is local groundwater and it is flowing to the north/northeast, VOC contamination would be captured by the East Trenches Plume Groundwater Collection and Treatment System. This zero-valence iron treatment system is effective in the removal of VOCs, which were detected in most of samples collected from the T-7 site, albeit at concentrations well below the soil ALs. The zero-valence iron treatment system may not be effective in treating plutonium and americium; however, these radionuclides are relatively immobile and do not readily migrate in groundwater.

When there is local groundwater and it is flowing to the south/southeast, any contamination would migrate parallel to the 903 Pad and Ryan's Pit plume. This plume has migrated towards the South Interceptor Ditch (SID) and Woman Creek drainage; however, discharge to surface water has not been observed nor is it expected, most notably due to insufficient saturated

thickness and periods of dry conditions (DOE 1999). Additionally, recent groundwater data from two Plume Extent Wells located south and near Trench T-7 (i.e., wells 04591 and 10194) indicate no VOC contamination (DOE 2002c). The two wells had uranium-233/234 and uranium-238 concentrations that were above RFCA Tier II ALs, but the concentrations were below background levels.

#### **Screen 5 – Are COC concentrations above Table 3 Action Levels for ecological receptors?**

Yes. One subsurface soil sample from BH4887 had an arsenic concentration of 23 mg/kg, which just exceeds the AL for ecological receptors of 21.6 mg/kg. Because the concentration is so close to the AL, and no other samples from any borehole at T-7 exceeded the AL for ecological receptors, it is concluded for the NFAA that there is no threat posed to ecological receptors by T-7. However, at this time, ecological ALs are not available for all receptors/chemical combinations, i.e., values are available for only a small subset of chemicals. Screen 5 currently evaluates only this subset and the remainder will be addressed through the ecological risk assessment portion of the Comprehensive Risk Assessment (CRA).

#### **Stewardship Analysis**

Application of the Soil Risk Screen to NE-111.4 indicates No Further Action (NFA) is necessary for protection of public health and environment. However, because subsurface soil at this PAC has contaminant concentrations that exceed soil ALs, both near-term and long-term stewardship actions have been recommended<sup>2</sup>. They are discussed below.

#### **Near-Term Management Recommendations**

Near-term recommendations for environmental stewardship include the following:

- Excavation at the site will continue to be controlled through the Site Soil Disturbance Permit process; and
- Site access and security controls will remain in place pending implementation of long-term controls.

#### **Long-Term Stewardship Recommendations**

Based on remaining environmental conditions at NE-111.4, no specific long-term stewardship activities are recommended beyond the generally applicable Site requirements that may be imposed on this area in the future, which are dependent upon the final remedy selected. Institutional controls that will be used as appropriate for this area include the following:

- Prohibitions on construction of buildings;
- Restrictions on excavation or other soil disturbance; and
- Prohibitions on groundwater pumping in the area of NE-111.4.

These specific long-term stewardship recommendations will also be summarized in the Rocky Flats *Long Term Stewardship Strategy*. No engineered controls, environmental monitoring, or

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<sup>2</sup> NE-111.4 is contiguous with other PACs (other trenches) with subsurface soil contaminant concentrations that exceed soil ALs. Therefore, there would be no reduction in the area requiring near-term and long-term stewardship actions if the subsurface soil in the PAC were removed.

physical controls (e.g., fences) are recommended as a result of the conditions remaining at NE-111.4.

NE-111.4 will be evaluated as part of the Sitewide Comprehensive Risk Assessment, which is part of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) and Corrective Measures Study/Feasibility Study (CMS/FS) that will be conducted for the Site. The need for and extent of any, more general, long-term stewardship activities will also be analyzed in RFI/RI and CMS/FS and will be proposed as part of the preferred alternative in the Proposed Plan for the Site. Institutional controls and other long-term stewardship requirements for Rocky Flats will ultimately be contained in the Corrective Action Decision/Record of Decision, in any post-closure Colorado Hazardous Waste Act permit that may be required, and in any post-RFCA agreement.

#### NFAA Summary

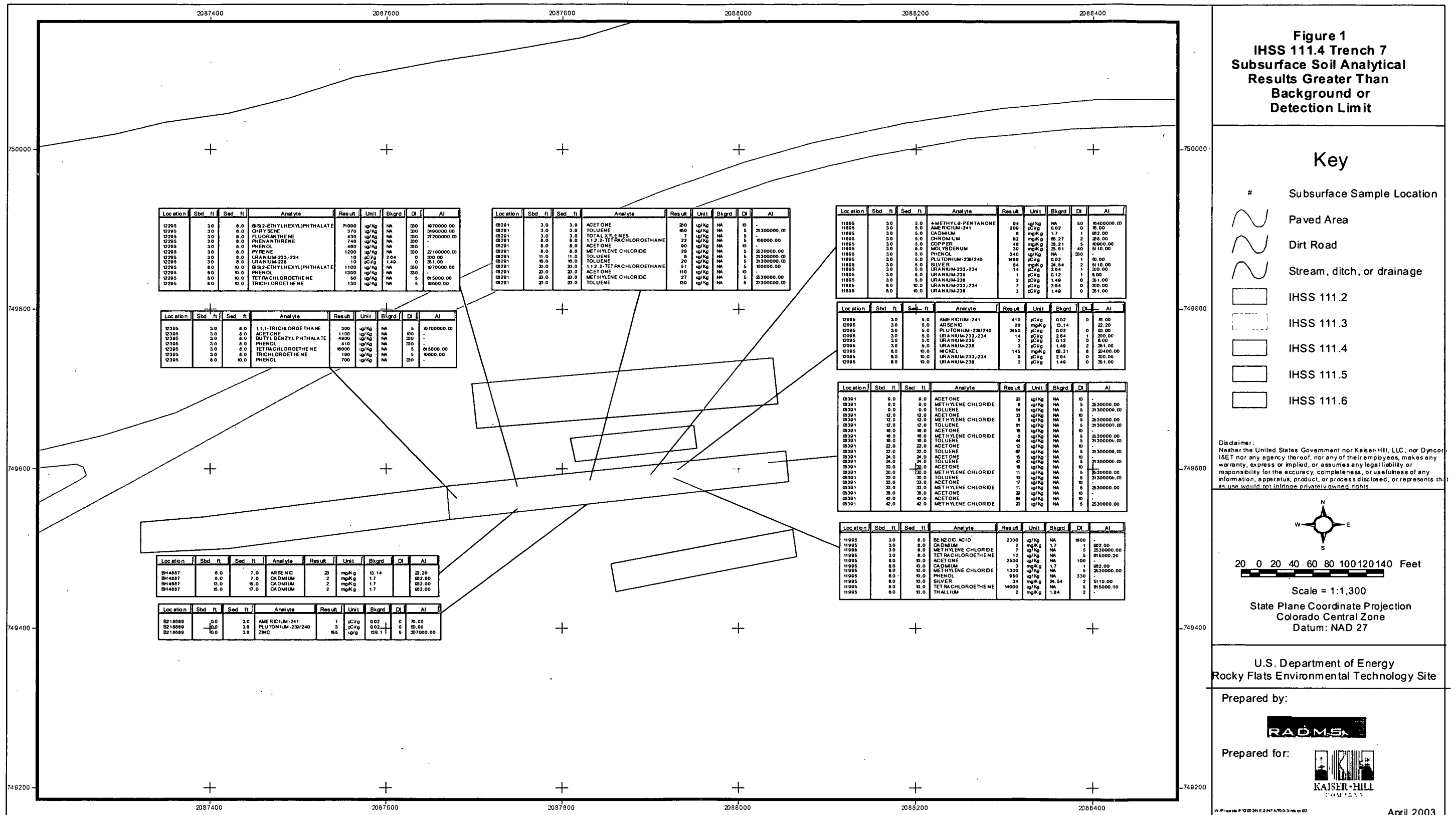
PAC NE-111.4 (Trench T-7) is proposed for NFAA. The Soil Risk Screen and ALs proposed in the RFCA Attachment 5 Modification dated 11/12/02 have been applied to this PAC. The risk screen shows no potential adverse risk to a wildlife refuge worker or ecological receptor. Plutonium is present in the buried waste at a maximum concentration of 2.45 nCi/g, which is below the 3 nCi/g limit that triggers further evaluation and potential soil removal. There is little potential for contaminated runoff because the site is located in a relatively flat area and the waste is buried. The dry conditions at Trench T-7 will substantially limit contaminant migration via groundwater. When groundwater is present, contaminants migrating to the north will be captured by the East Trenches plume treatment system. VOC contamination immediately south of Trench T-7 has not been observed; however, should contaminants migrate in this direction, degradation is expected to prevent discharge of these contaminants to surface water. Therefore, no further accelerated action is required.

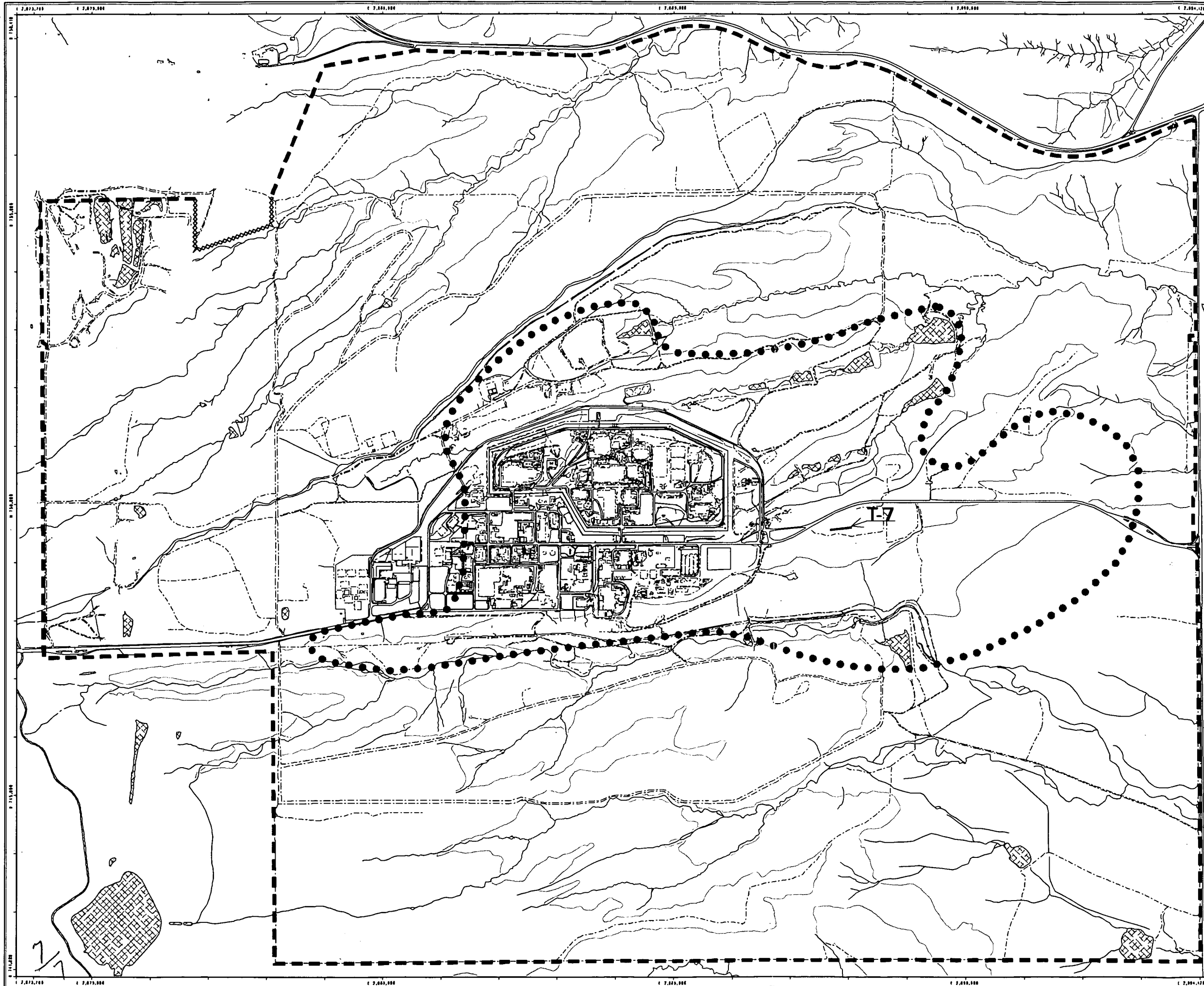
#### References

DOE, 1992, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Trenches and Mound Site Characterization Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, *903 Pad/Ryan's Pit Plume Project Completion Report, Fiscal Year 1999*, Rocky Flats Environmental Technology Site, RF/RMRS-99-424.UN , August 30, 1999.





**Figure 2**

## Area of Landslides and High Erosion Potential

### EXPLANATION

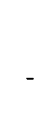
- Areas of landslides and high erosion. Contaminated sites within these areas must be evaluated per Risk Screen 2 of Figure 3.
- ⋯ The anticipated boundary of areas that will be subject to institutional controls is subject to modification based upon characterization, future response actions, the results of the comprehensive risk assessment, and the final remedial/corrective action decision in the final CAD/ROD. See Section 1.2.
- N Approximately 25 acres identified as proposed Wind Technology Expansion Area in Rocky Flats National Wildlife Refuge Act 2001.

### Standard Map Features

- ⊠ Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- - - Rocky Flats Environmental Technology Site boundary
- == Paved roads
- - - Dirt roads

### NOTES:

- References:
1. Report on Soil Erosion and Surface Water Sediment Transport Modeling for the Actinide Migration Evaluation at the Rocky Flats Environmental Technology Site (August 2000)
  2. Geologic Mapping: Shroba, R.R., and Carrara, P.E. Preliminary Surficial Geologic Map of the Rocky Flats Plant and Vicinity, Jefferson and Boulder Counties, Colorado: U.S. Geological Survey Open-File Report 94-162, Scale 1:6000 Site source of topo base; see OFR 94-162 (on map)



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27